Rev 1.3, 7/23/2018

Request for Special Temporary Authority

Virgin Orbit, LLC

Explanation of Experiment:

Virgin Orbit LLC ("Virgin Orbit") is requesting "Special Temporary Authority (STA)" to operate an S-Band Transmitter at 2262MHz. If 2262 MHz is unavailable Virgin Orbit is open to any frequency within 2200-2290MHz band. The purpose of the experiment is to test the ability of Virgin Orbit's Long Beach ground station to track satellite launch vehicles. Long Beach ground station is receive only and is located at 4022 E Conant St., Long Beach, CA 90808. Virgin Orbit plans to use this ground station for tracking its satellite launch vehicles. The plan is to fly a small manned aircraft with Quasonix transmitter and antennas around Long Beach, CA and track that aircraft using the ground station in Long Beach, CA. The transmitter inside the aircraft will transmit test data at the assigned frequency. Two different data rates will be tested at the same assigned frequency. Two Antennas might be used in order to get better coverage, in such a case the signal from the transmitter will be split between the antennas using a 3dB RF splitter.

Virgin Orbit is requesting an area of operation with a radius of 20 miles around Long Beach Airport (LGB). The aircraft will fly within the requested area. Maximum altitude of the aircraft is 2500 ft. The transmitter will stay on for the full duration of the flight, including pre-flight checkout, taxi, and takeoff/landing unless restricted by FAA.

Test will be conducted between Aug 7th, 2018 and Feb 5th, 2019 or as soon as the STA is approved. The aircraft is expected to be flown only 4 to 6 times over a period of 6 months after the STA license is granted. Prior coordination will be made with DOD Western Area Frequency Coordinator before every flight and anytime the transmitter is turned on.

	Data Rate	
EIRP (Includes Antenna Gain and Cable Losses)	-8 dBm	-8 dBm
Bandwidth	4.21 MHz	2.11 MHz
Modulation Scheme	SOQPSK-TG	SOQPSK-TG
Emissions Designator	4M21G1W	2M11G1W
Carrier Frequency Tolerance	+/- 20 ppm	+/- 20 ppm
Transmitter Manufacturer	Quasonix	
Transmitter Partnumber	QSX-VSR4-1111-20-80-04AB-VP-WV	
Antenna Manufacturer and Part Number	South West Antennas (1065-028)	
Antenna Gain	4.2dBic	
Antenna Horizontal (AZ) Beamwidth	104 Degrees	
Antenna Vertical (AZ) Beamwidth	88 Degrees	

Figure 1: Transmitter Specs

Location	**Radius of Operation**	**Max Altitude**
Long Beach Airport (LGB) (33.82, -118.151)	20 miles	2,500 ft

Figure 2: Area of operation

Figure 3: Map showing area of operation

Stop Buzzer Point of Contact:

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